2.3/17

$$\lim_{x\to+\infty}\sqrt[3]{\frac{2+3x-5x^2}{1+8x^2}}=\sqrt[3]{\lim_{x\to\infty}\frac{2+3x-5x^2}{1+8x^2}}$$

$$=\sqrt[3]{-\frac{5}{8}}$$

$$\lim_{x\to+\infty}\sqrt[3]{\frac{x^2}{x^2}}\sqrt[3]{\frac{\frac{2}{x^2}+\frac{3}{x}-5}{\frac{1}{x^2}+8}}$$

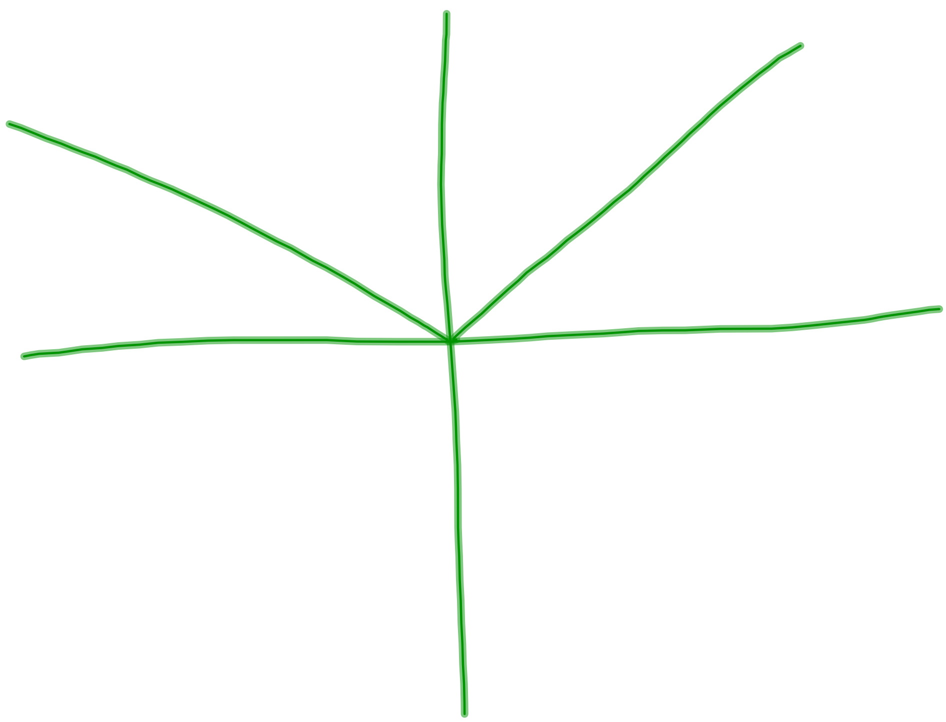
19)
$$\lim_{x\to-\infty} \frac{\sqrt{5x^2-2}}{x+3}$$

$$=\lim_{x\to-\infty} \frac{\sqrt{x^2}\,\sqrt{5-\frac{2}{x^2}}}{x\left(1+\frac{3}{x}\right)}$$

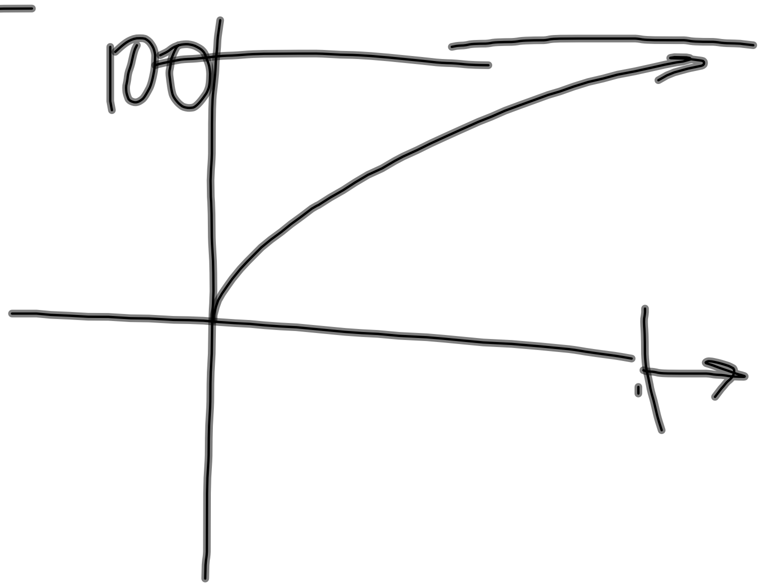
$$|x| = \begin{cases} x, & x \ge 0 \\ -x, & x < 0 \end{cases}$$

$$=\lim_{x\to-\infty} \frac{|x|\,\sqrt{5-\frac{2}{x^2}}}{x\left(1+\frac{3}{x}\right)}$$

$$=\lim_{x\to-\infty} \frac{(-x)\sqrt{5-2/x^2}}{x\left(1+3/x\right)} = \frac{-\sqrt{5}}{1}$$



9] $\lim_{\substack{x \to +\infty \\ n \geq 2}} \sqrt[n]{x} = +\infty$



$\sqrt{x} > 100$

$x > 100^2$

$$\lim_{x \to -\infty} \sqrt[n]{x} = \begin{cases} \text{dne}, & n \text{ even} \\ -\infty, & n \text{ odd} \end{cases}$$

29) $f(x) = \begin{cases} 2x^2+5 & , x<0 \\ \dfrac{3-5x^3}{1+4x+x^3} & , x \geq 0 \end{cases}$

c) $\lim_{x \to 0} f(x) = DNE$

$\lim_{x \to 0^-} f(x) = 5$

$\lim_{x \to 0^+} f(x) = 3$

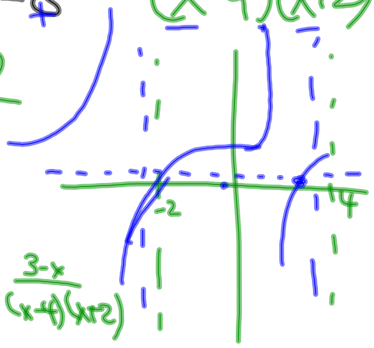
a) $\lim_{x \to -\infty} f(x)$

$= \lim_{x \to -\infty} 2x^2+5 = +\infty$

22/25* how do I graph

$$f(x) = \frac{3-x}{x^2-2x-8} = \frac{3-x}{(x-4)(x+2)}$$

VA $x = 4, -2$



$\frac{3-x}{(x-4)(x+2)}$

Zeros $f(x) = 0$

$3 - x = 0$

$x = 3$

y-int

$$f(0) = \frac{3-0}{(0-4)(0+2)} = -\frac{3}{8}$$

HA $\frac{3-x}{(x-4)(x+2)} \Rightarrow \frac{-x}{x^2} \Rightarrow -\frac{1}{x}$

$y = 0$

to id + & − intervals

$\frac{3-x}{(x-4)(x+2)}$

① id "cut points"

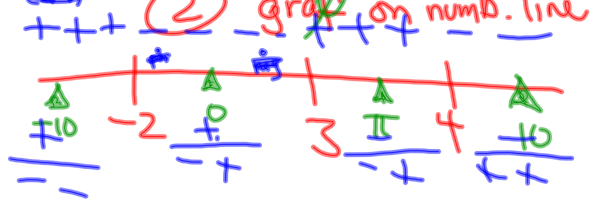
num = 0? den = 0?

$x = 3$ $x = -2, 4$

$\frac{3-x}{(x-4)(x+2)} > 0$

$(-\infty, -2) \cup (3, 4)$

② graph on numb. line

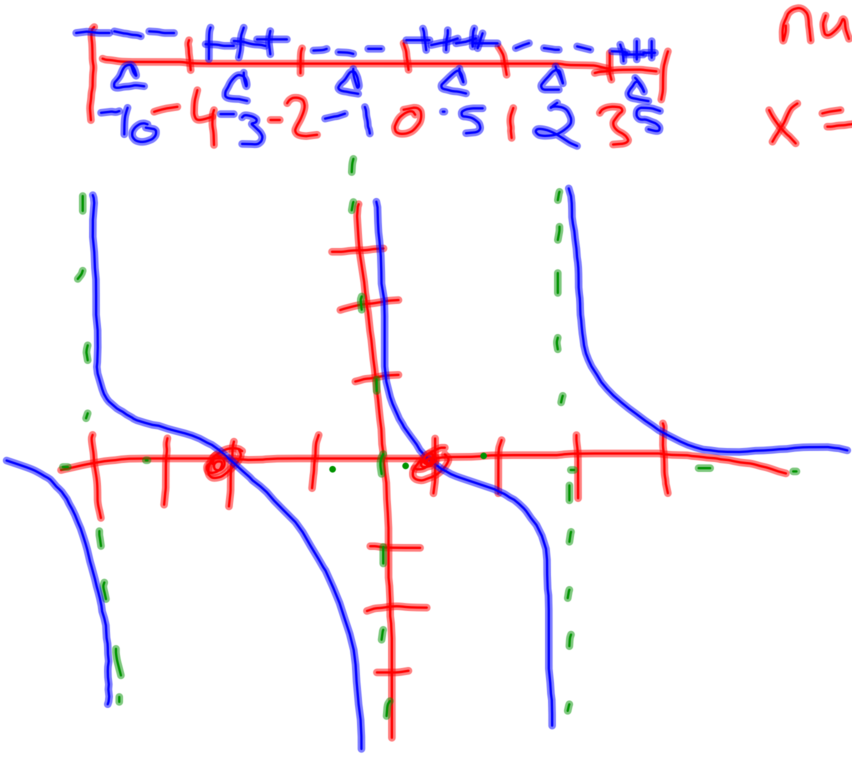


③ pick a pt in each int.

CLAIM: orig. fn only chgs sign at a cut point

SIGN
not to be confused
SINE

Graph $\dfrac{(x-1)(x+2)}{(x)(x-3)(x+4)}$



num

$x = 1, -2$

denom

$x = 0, 3, -4$

2.1/17

$f(x)=0$ if x is an integer

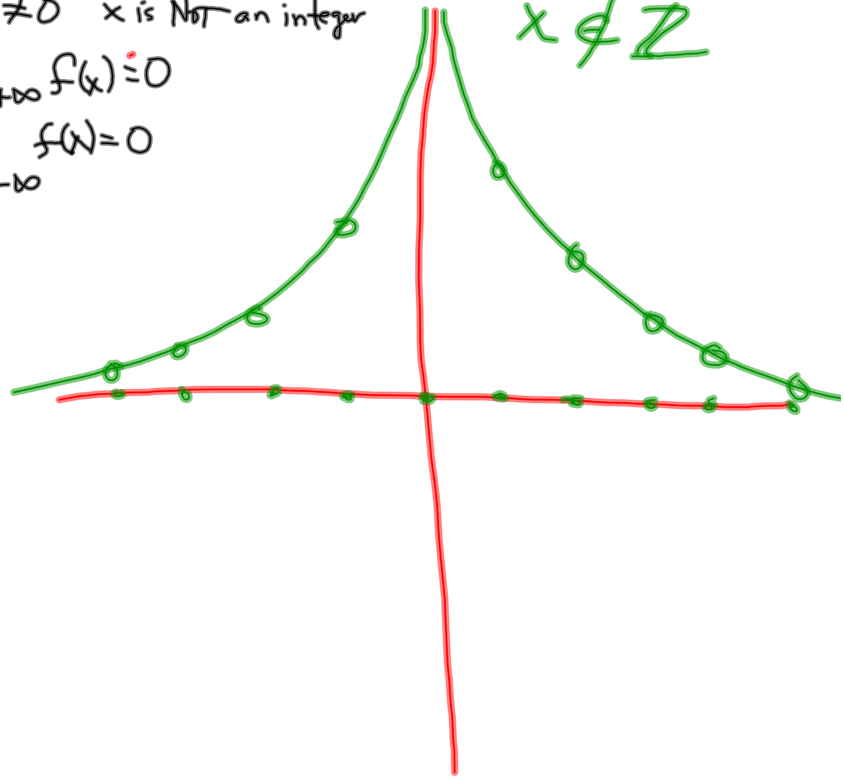
$f(x)\neq 0$ x is NOT an integer

$\lim_{x\to+\infty} f(x) = 0$

$\lim_{x\to-\infty} f(x)=0$

$x \in \mathbb{Z}$

$x \notin \mathbb{Z}$



19) $$\lim_{x \to -\infty} \frac{\sqrt{5x^2-2}}{x+3}$$

$$\frac{\sqrt{x^2}\sqrt{5-\frac{2}{x^2}}}{x\left(1+\frac{3}{x}\right)}$$

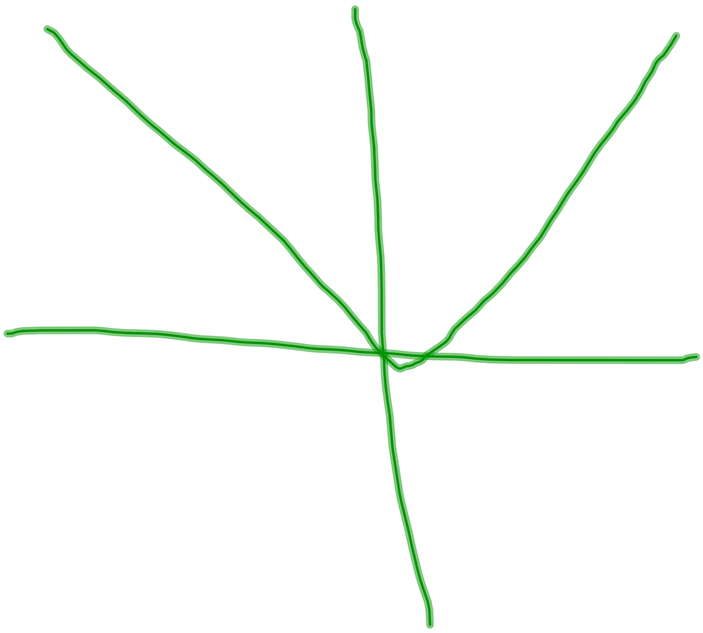
$$|x| = \begin{cases} \cancel{x}, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

$$\frac{|x|\sqrt{5-0}}{x(1+0)}$$

$$\frac{-\cancel{x}\sqrt{5}}{\cancel{x}(1)}$$

$$-1(\sqrt{5})$$

$$-\sqrt{5}$$



21) $$\lim_{y \to -\infty} \frac{2-y}{\sqrt{7+6y^2}}$$

$$\frac{y\left(2/y - y/y\right)}{\left(\sqrt{y^2}\right)\left(\sqrt{7/y^2 + 6}\right)} \Rightarrow \frac{y(-1)}{|y|\sqrt{6}} \Rightarrow \frac{-\cancel{y}}{-\cancel{y}\sqrt{6}} \Rightarrow \frac{1}{\sqrt{6}}$$

17)

$$\lim_{x\to\infty} \sqrt[3]{\frac{2+3x-5x^2}{1+8x^2}} =$$

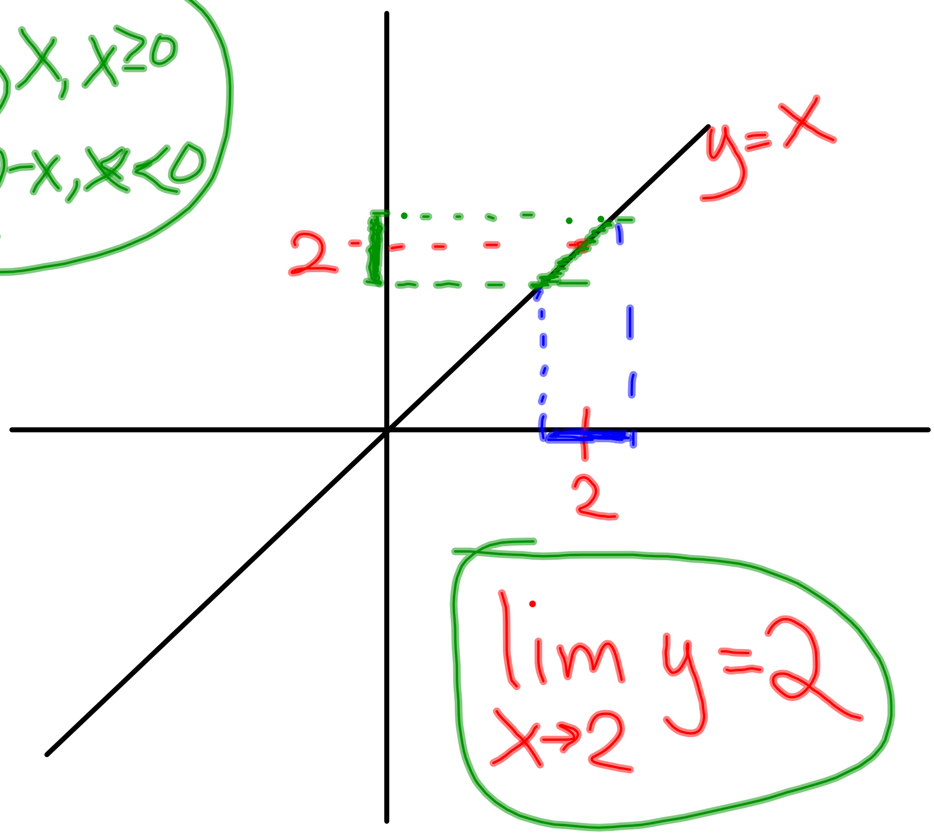
$$\sqrt[3]{\lim_{x\to\infty} \frac{2+3x-5x^2}{1+8x^2}}$$

$$= \sqrt[3]{\lim_{x\to\infty} \frac{\cancel{x^2}\left(\frac{2}{x^2}+\frac{3}{x}-5\right)}{\cancel{x^2}\left(\frac{1}{x^2}+8\right)}}$$

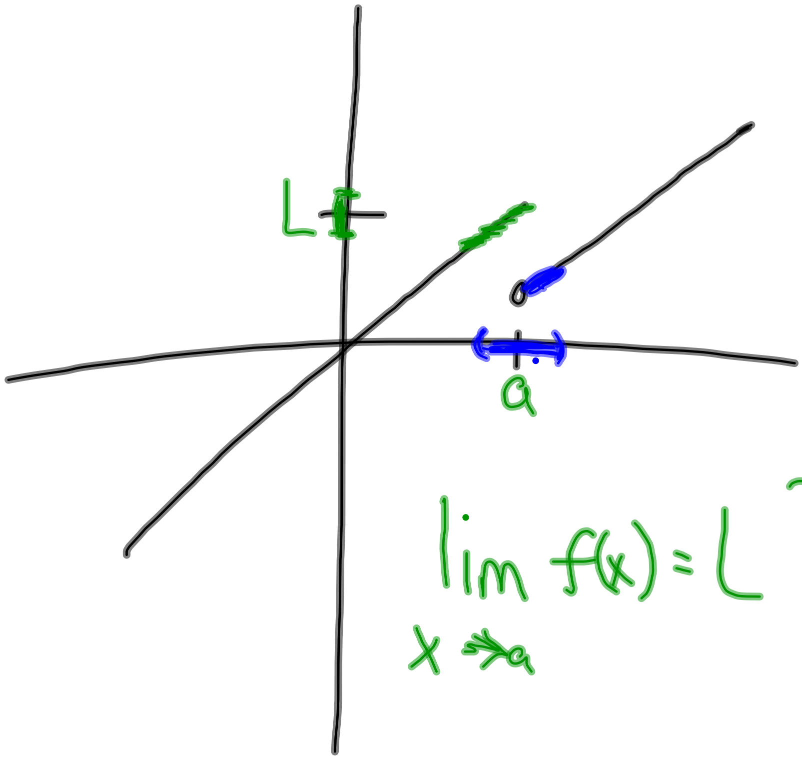
$$= \sqrt[3]{\frac{-5}{8}}$$

$$\lim_{x\to\infty} \frac{\sqrt[3]{x^2}\,\sqrt[3]{\frac{2}{x^2}+\frac{3}{x}-5}}{\sqrt[3]{x^2}\,\sqrt[3]{\frac{1}{x^2}+8}}$$

$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & \cancel{x} < 0 \end{cases}$$



$$\lim_{x \to 2} y = 2$$



$$\lim_{x \to a} f(x) = L \,?$$